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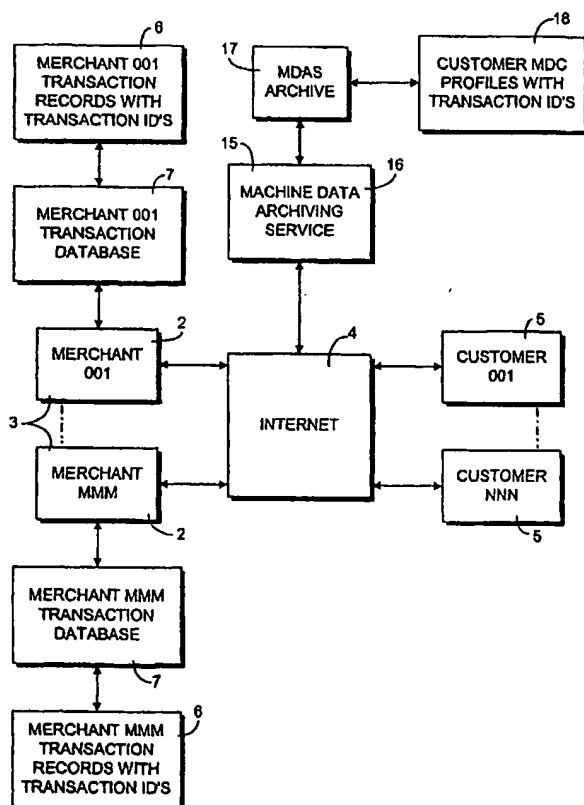
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- (71) Applicant and  
(72) Inventor: BARBER, Timothy, P. [US/US]; 120 North Mobley Drive, Boise, ID 83712 (US).
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- (74) Agent: BROWN, Mark, E.; Shughart Thomson & Kilroy, P.C., Suite 1800, Twelve Wyandotte Plaza, 120 West 12th Street, Kansas City, MO 64105 (US).

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(54) Title: ONLINE MACHINE DATA COLLECTION AND ARCHIVING PROCESS



(57) Abstract: An online machine data collection and archiving process (15) generates a machine data profile (18) of a customer computer (5) accessing a transaction form of a merchant web site (3) and links the machine data profile (18) and a transaction record (6) with customer identifying information using a unique transaction identification string. The process preferably captures parameters typically communicated as part of web accesses, such as an IP address, an HTTP header, and cookie information. The process additionally causes the customer computer (5) to process self-identification routines by processing coding within the merchant transaction form, the self-identification routines yielding further profile parameters. The process further includes a routine for bypassing an intervening proxy to the merchant web site (3) to reveal the true IP address of the customer computer (5).

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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## 1       **ONLINE MACHINE DATA COLLECTION AND ARCHIVING PROCESS**

### 3       **Cross-Reference to Provisional Application**

4       This application claims benefits from provisional application, Serial No.  
5       60/209,936 filed June 7, 2000 and entitled METHOD FOR COLLECTING MACHINE  
6       DATA FROM CUSTOMERS ON A COMPUTER NETWORK.

### 8       **Background of the Invention**

9       The present invention relates to identity detection techniques and, more  
10      particularly, to a process for collecting and utilizing machine-identifying data of computers  
11      and other online appliances used in online interactions and transactions and associating the  
12      collected machine data with such online interactions.

13      The internet, or global computer network, represents a new medium for marketing  
14      similar to the way mail ordering and telephone ordering did in the past. A downside of  
15      internet marketing is that it also presents new opportunities for unscrupulous persons to  
16      take advantage of the mechanisms of internet transactions by fraudulent and deceptive  
17      practices. Merchants and financial institutions bear the initial costs of fraud. However,  
18      consumers ultimately pay the costs in the form of prices and credit rates which must take  
19      into account losses from fraud. Internet purchases typically involve the use of web page  
20      forms which are filled in by the customer with identity, address, purchase, shipping, and

1 payment information and submitted to the online merchant for processing. Internet  
2 purchases are most often paid for by way of credit cards. While a merchant's software  
3 may be able to verify the existence and status of a credit card account number and an  
4 authorization for a specific amount, the merchant is often not able to match a credit card  
5 number with a specific purchaser or shipping address. Thus, absent any overt indication  
6 otherwise, a merchant generally assumes that anyone using a credit card is authorized to  
7 do so and that a customer is who he identifies himself to be.

8       An important step in combating fraud is accurate identification of the computers  
9 through which customers make transactions and associating such identities with  
10 transactions which arouse suspicions or which ultimately turn out to be fraudulent. Basic  
11 machine identity is essential to the manner in which the internet operates. We speak in  
12 terms of "going" to a web site. In reality, "going" to a web site involves sending a request  
13 for a web page file in a directory or folder on a computer located at a specific internet  
14 protocol, or IP, address. In order for the web page file to be returned to the requesting  
15 computer for processing into a displayed "web page", the request must include return  
16 "directions" in the form of the basic identity of the requesting computer, including its IP  
17 address. Some web sites are implemented with software which enables responses to web  
18 page requests to be tailored to specifics of the requesting machine's configuration, specific  
19 web browser, and the like. For this reason, current versions of browsers usually  
20 communicate configuration information in addition to a return IP address and return path.

1           The IP address of a page requesting computer can give an indication of the specific  
2 country where the computer is located. Further, identification of a page-requesting  
3 computer can also recognize a returning user using the same computer as during a  
4 previous access. For example, placing an HTTP (hypertext transfer protocol) "cookie" on  
5 a page-requesting computer can make it possible to identify the computer on a later  
6 access.

7           Because direct interaction with a customer's computer is essential in detecting  
8 fraud, it has been assumed that any viable fraud detection software must be integrated with  
9 a merchant's software. As a result, most existing fraud detection solutions require  
10 merchants to either abandon or extensively modify their existing web-based transaction  
11 processing software. An additional problem with focusing fraud detection at single  
12 merchants is that perpetrators of fraud often hit many merchants in an attempt to avoid or  
13 delay detection. Thus, an ideal system for fraud detection in online marketing would only  
14 minimally affect the merchant's existing software and would route fraud detection efforts  
15 through a central, third-party entity serving a large multitude of merchants.

16

17

### **Summary of the Invention**

18           The present invention provides a process for collecting data associated with a  
19 customer's computer during access of a merchant, financial, other host web site, and  
20 associating a transaction identification number with the data and with a transaction form of  
21 the merchant. Generally, the present invention captures machine identifying data from a

1 computer or other digital appliance accessing a host web site, sends the captured data to a  
2 machine data archive along with a unique transaction identification string for storage in the  
3 archive and writes the same transaction identification string into a transaction form  
4 through which transactions with the host web site are conducted. The machine data is,  
5 thus, associated with the customer identification data within the transaction form by way  
6 of the transaction identification string and can be used on-the-fly or at a later time for a  
7 variety of purposes including, but not limited to, fraud detection. Although the term  
8 "archive" is used, the machine data collected need not be stored permanently.

9 The machine data collection process of the present invention is intended to be  
10 employed in a variety of applications including, but not limited to: online purchases and  
11 orders; online banking, bill payment, and funds transfers; online registrations, such as for  
12 memberships, product warranties, applications for credit, renewal of subscriptions and  
13 licenses; online technical support; and the like. The term "transaction" is used in the  
14 present invention to describe an interaction effected between a digital appliance and a host  
15 system. However, the term "transaction" is not intended to be restricted to only  
16 commercial interactions involving purchases. The term "transaction" is intended to apply  
17 to an interaction of a remote digital appliance with a host system using a relatively  
18 anonymous type of access process over a digital medium in which some form of self-  
19 identification of the accessing appliance is inherent in the access process and in which the  
20 true identity of the accessing party, the true source address of the appliance on the

1 medium, and/or the true machine characteristics of the accessing appliance is/are essential  
2 or desirable to the interaction.

3 The host entity which operates the host system accessed is intended to encompass  
4 a commercial, financial, educational, governmental, associational, or other type of entity.  
5 The term "merchant" will be used herein to refer to such a host entity without intent to  
6 limit the present invention to commercial transactions. The medium of access is intended  
7 to be interpreted as including a global computer network such as the internet or world  
8 wide web, as well as other types of networks which may be less than global but which are  
9 publicly and/or anonymously accessible. The term "internet" will be used herein to refer  
10 to the medium through which accesses to the host entity are made. The terms "customer  
11 computer" or "machine" are used herein to refer to a device for effecting remote access to  
12 a host system over a digital medium and are meant to encompass not only conventional  
13 types of personal computers, but also additional types of "digital appliances" with online  
14 access capabilities, such as: cell phones, personal digital assistant devices, electronic game  
15 systems, television sets with online access capabilities, web appliances for vehicles, and  
16 any other type of device with online access capabilities whether connected to a wired  
17 communications network directly or by a radiant technology.

18 The machine data collection process of the present invention contemplates a two  
19 party process embodiment in which a "merchant" processes and/or stores machine data  
20 profiles of customer computers in-house, as well as a three party process embodiment in

1    which machine data profiles of customer computers are processed and/or stored for the  
2    merchant by a third-party machine data collection and archive service.

3           In a two party embodiment of the data collection process of the present invention,  
4    the customer machine data is captured by a merchant or host system which also generates  
5    a unique transaction identification (ID) string and assigns or associates the transaction ID  
6    with a machine data profile of the customer machine data profile. In the two party  
7    process, the merchant system captures customer computer data which is inherently passed  
8    from the customer computer to the merchant's web site, such as an IP address of the  
9    customer computer and an HTTP header. Additionally, according to the present  
10   invention, the merchant web page code may have routines or calls for external routines  
11   which, when processed by the customer computer, cause the customer computer to  
12   further identify itself by collecting and returning certain machine and software  
13   configuration characteristics, which can be used to identify the particular customer  
14   computer. The two party process may include the generation and setting of an HTTP  
15   cookie in the customer browser for recognition upon a later access with the merchant web  
16   site.

17           Although the two-party embodiment of the machine data collection process of the  
18   present invention has utility for some applications, the three party embodiment is preferred  
19   for applications in which analysis of a maximum number of customer computer profiles is  
20   desirable, such as certain types of marketing processes and fraud detection and control  
21   processes. In a three embodiment of the present invention, the customer machine data of



1 computers accessing the second party or merchant web site is communicated to and stored  
2 within a third party system, referred to herein as a machine data archive service. In the  
3 three party process, the transaction ID could be generated by the merchant system, but is  
4 preferably generated by the archive service. The use of the term "archive" is not meant to  
5 indicate that the customer machine data profiles are stored permanently within the third  
6 party system. Permanent storage of such profiles may not be practical, as far as yielding  
7 beneficial results to the purposes for which the profiles are collected. Thus, the term  
8 "archive" is meant to indicate a central storage facility, such as a database, with a selected  
9 retention period, with purging of most profiles after a certain length of time.

10 In the three party process a routine or line of code is added into the hypertext  
11 markup language (HTML) code which defines the merchant's web page, particularly an  
12 order or transaction form page. The added routine issues a request for a machine data  
13 collection (MDC) script to the third-party web site when the form page code is processed  
14 by the customer's browser. When the script request is received by the machine data  
15 archiving service (MDAS), the archive service generates a unique transaction  
16 identification (TA/ID) and checks for its own cookie. If no MDAS cookie is present, the  
17 archive service sends a cookie to the requesting computer along with a machine data  
18 collection (MDC) script having the transaction ID embedded therein. The MDC script is  
19 executed by the customer's browser, causing collection of certain data from the  
20 customer's computer which is sent back to the archive service along with the transaction  
21 ID and stored in a machine data profile in the machine data archive. The transaction ID is

1 written into the transaction form, and when the transaction form is submitted to the  
2 merchant web site, the transaction ID string becomes a part of the transaction data record,  
3 along with customer identification, location, and financial information.

4 The machine data initially collected and stored in each profile preferably includes  
5 the transaction ID, the apparent IP address of the customer's computer, a conventional  
6 HTTP header which identifies the customer's browser versions and certain configuration  
7 aspects of the browser, and the archive service's cookie. The combination of such  
8 information, minus the transaction ID, will be relatively rare but may not be unique.  
9 Additionally, customers intent on conducting fraudulent transactions often hide their IP  
10 address behind HTTP proxies. In order to further narrow the machine profile, in a  
11 preferred embodiment of the present invention, the MDC script performs additional  
12 machine profiling operations: generation of a machine "fingerprint" and a proxy  
13 "piercing" operation.

14 In the fingerprint generation operation, the MDC script assembles an attribute  
15 string formed by various attributes or configuration settings of the browser which can be  
16 queried by the script. The MDC script then performs a conversion process on the  
17 attribute string to generate a fingerprint string having content which is a function of the  
18 original content of the attribute string. The conversion process is preferably a "hashing"  
19 function which is, in effect, an irreversible encryption algorithm. The generation of a  
20 conventional checksum is one example of a type of hashing function. For example, if the  
21 attribute string is formed by alphanumeric characters, the conversion process is performed

1 on the string of codes representing the characters. The particular conversion process or  
2 hashing function used may be one of many types of conventional conversion algorithms or  
3 hashing functions, which are typically used for data integrity tests. The resulting string  
4 from the MDC conversion process is a so-called fingerprint, which is returned to the  
5 archive service along with the transaction ID for storage in the machine profile. A time  
6 value, queried from the customer computer time-of-day clock, is returned with the  
7 fingerprint string and stored in conjunction therewith.

8 An HTTP proxy is one of several types of proxies through which a browser may  
9 be setup to operate. Setting up an HTTP proxy causes HTTP requests to be relayed by a  
10 primary gateway, through which the computer actually interfaces to the internet, to a  
11 remote secondary gateway, or proxy, with an IP address different from the primary  
12 gateway IP address. Such redirection hides the true IP address of a computer. The proxy  
13 piercing operation of the MDC script queries the customer computer for any LAN (local  
14 area network) address which may be assigned to the computer and reads the system time  
15 of day clock. Then attempts are made to send the LAN address, if any, the time value,  
16 and the transaction ID to the archive service using a protocol which will not be redirected  
17 through the HTTP proxy, for example a lower level protocol such as TCP/IP or UDP  
18 protocols. If the attempt is successful, the message containing the time value, the  
19 transaction ID, and LAN address arrive at the archive service web site with the true return  
20 IP address of the customer computer, whether an HTTP proxy intervenes or not. The  
21 LAN address and IP address so derived are stored in the machine profile. It should be

1 noted that the use of an HTTP proxy is not, of itself, an indication of fraud. However, the  
2 acquisition of an additional IP address is one more parameter with which to identify a  
3 particular computer.

4 When, and if, the customer submits the transaction form to the merchant, the  
5 transaction ID string is communicated to the merchant, along with other customer  
6 information such as name, address, credit card number and the like plus transaction  
7 information. The complete transaction record is stored on the merchant's system and is  
8 associated with a specific machine identity profile within the archive service by way of the  
9 transaction ID string. Thereafter, the stored machine identity profiles and transaction  
10 records of large numbers of transactions can be analyzed by various fraud detection  
11 techniques to detect patterns of fraud and fraud attempts and, preferably, identify and  
12 locate the sources of such activity.

13 The machine data profiles stored in the archive service need not be combined with  
14 the customer identification information for non-suspicious transactions, to thereby  
15 preserve the privacy of non-suspicious customers within the machine data archive.  
16 However, the processes of the present invention do not require that the customer  
17 identification information be kept separated from any associated machine data profiles, and  
18 there may be reasons to combine the associated records.

19  
20

1                                    **Brief Description of the Drawings**

2                    Fig. 1 is a simplified block diagram illustrating a plurality of customer and  
3 merchant computers interfaced to the internet along with a machine data archiving service  
4 computer for practicing the machine data collection process of the present invention.

5                    Fig. 2 is a simplified block diagram illustrating connection of a customer computer  
6 to the internet, with optional components shown in phantom lines.

7                    Fig. 3 is a flow diagram illustrating principal steps of the machine data collection  
8 and archiving process according to the present invention.

9                    Fig. 4 is a flow diagram illustrating more detailed steps of the machine data  
10 collection and archiving process according to the present invention.

11                   Fig. 5 is a flow diagram illustrating a still further detailed steps in the machine data  
12 collection and archiving process of the present invention.

13                   Various objects and advantages of this invention will become apparent from the  
14 following description taken in relation to the accompanying drawings wherein are set  
15 forth, by way of illustration and example, certain embodiments of this invention.

16                   The drawings constitute a part of this specification, include exemplary  
17 embodiments of the present invention, and illustrate various objects and features thereof.

18

19

1                   **Detailed Description of the Invention**

2           As required, detailed embodiments of the present invention are disclosed herein;  
3   however, it is to be understood that the disclosed embodiments are merely exemplary of  
4   the invention, which may be embodied in various forms. Therefore, specific structural and  
5   functional details disclosed herein are not to be interpreted as limiting, but merely as a  
6   basis for the claims and as a representative basis for teaching one skilled in the art to  
7   variously employ the present invention in virtually any appropriately detailed structure.

8           Referring to the drawings in more detail:

9           The reference numeral 1 (Fig. 3) generally designates  
10   a process for online collection of machine identifying or profiling data of computers  
11   involved in commercial transactions and for archiving such data to facilitate analysis for  
12   fraud detection purposes. The process collects machine identifying or profiling data of  
13   computers involved in commercial transactions and archives such data in a third-party  
14   machine data archive service in association with a transaction identification string or ID  
15   which is also written into a transaction form of a merchant with whom the customer is  
16   conducting a transaction.

17           Fig. 1 illustrates a plurality of host entities or merchants with corresponding  
18   merchant computers 2, on which are operated merchant web sites 3 which are accessible  
19   over a global computer network, such as the internet 4, by a plurality of customer  
20   computers 5. The merchant computers 2 execute various programs which enable the sale  
21   of products or services by way of the internet 4. The merchant web sites 3 typically make

1 use of form type web pages with which the customers 5 interact by filling in various data  
2 fields, for example, name, address, shipping address, telephone number, credit card type  
3 and number and expiration date, and description and quantities of products to be ordered.

4 The merchant transaction forms are usually written in hypertext markup language  
5 (HTML) and may include requests for code written in other languages, such as Java and  
6 the like. When a customer 5 accesses a merchant's transaction form, a transaction form  
7 file is communicated to the customer's computer with various data fields displayed as fill-  
8 in boxes or the like. The customer fills in the appropriate fields and selects a submit  
9 "button" which activates a routine to transfer the collected information back to the  
10 merchant web site 3 for processing. The returned "form" is a data record 6 which is  
11 stored in a merchant transaction database 7 for retrieval and processing in due course to  
12 cause the ordered items to be gathered, packaged and prepared for shipment, along with  
13 financial processing to debit the customer's credit account. The financial processing may  
14 include a validity check of the credit account and an authorization check for the amount of  
15 purchase with the credit card issuer. Additionally, inventory management processes are  
16 executed based on the items withdrawn from stock for shipment.

17 In a three party embodiment of the present invention, the process 1 makes use of  
18 an entity referred to herein as a machine data archiving service, MDAS or archive service,  
19 which operates an archive service computer system 15, including an archive service web  
20 site 16. The archive service system 15 maintains a machine data archive service database  
21 or archive 17 in which the machine data collection profiles 18 from customer computers 5

1 of the merchants 2 are stored. The archive service web site 16 is interfaced to the internet  
2 4. The archive service 15 is preferably independent of the merchants and may be operated  
3 by a merchants' association, a financial institution or association thereof, or may be an  
4 independent contractor. Alternatively, it is conceivable that a merchant with a high  
5 volume of online sales could operate its own in-house machine data profile collection and  
6 archiving service 15, for fraud detection or possibly for marketing purposes.

7 Referring to Fig. 2, a customer computer system 5 includes a customer computer  
8 20 interfaced to the internet 4 by way of a primary gateway 22, as of an internet service  
9 provider (ISP). The computer 20 might be one of many on a local area network or LAN  
10 24 which includes a router or switch which routes data from the internet 4 to the  
11 computers on the network. The computer 20 may communicate through the internet 4 by  
12 way of a HTTP (hypertext transfer protocol) proxy 26, which disguises the internet  
13 protocol (IP) address of the actual gateway 22. The computer 20 accesses web sites on  
14 the internet 4 using a customer web browser 28 which processes HTML language and  
15 various other standard web oriented languages to display or otherwise render the content  
16 of web pages and interact therewith. The browser 28 is normally enabled to accept  
17 "cookies" 30 which are stored in a cookie file. Cookies 30 are data strings which are  
18 issued by web sites and give an indication of a previous visit to a particular web site and  
19 may indicate a particular configuration or set of preferences of the customer's setup of the  
20 computer 20. Typically, the customer computer 20 has a time of day clock/calendar 32.



1           The customer computer 20 may have a fixed IP address, depending on the manner  
2   in which it is interfaced to the internet. More commonly, the customer computer 20 will  
3   have a temporary or dynamically assigned IP address which is determined by the primary  
4   router 22. The primary router 22 has an IP address, as do a router of a LAN 24 or an  
5   HTTP proxy 26 if either is present in the customer's computer system 5.

6           Fig. 3 illustrates the principal actions or steps of a general or basic process 34 of  
7   the process 1 for collecting machine identifying data from customer computers 5. At step  
8   35, at least one machine identifying profile parameter is captured upon access of a  
9   customer computer 5 or other online access device with a host or merchant web site 3. A  
10   unique transaction identifier or TA/ID is generated at 36 and associated at 37 with the  
11   captured profile parameter. The transaction ID is also associated at step 38 with a  
12   transaction record generated as a result of the interaction or transaction conducted  
13   between the customer computer 5 and a merchant web site 3. Although not specifically  
14   shown in Fig. 3, the process 34 may capture machine profile data that is passed from the  
15   customer computer 5 to the merchant computer 3 as an inherent step of the customer  
16   computer 5 accessing the merchant computer 3. Alternatively, the process 34 may pass  
17   routines to the customer computer 5 to cause it to "self-identify" itself by querying certain  
18   configuration parameters and passing such information to a machine profile stored either  
19   within the merchant's system 2 or in a third party archive 17. The process 34, thus,  
20   encompasses a two-party embodiment or a three party embodiment of the machine data  
21   collection and archiving process 1 of the present invention.

1           Referring particularly to Fig. 4, a more particular three party embodiment of the  
2 machine data collection and archiving process 1 begins at step 40 with the coding of a  
3 machine data collection (MDC) script request into the web page code for a transaction  
4 form of a merchant web site 3. When a customer 5 accesses the merchant transaction  
5 form at step 42, the customer browser 28 processes the transaction page code, including  
6 the MDC script request, which causes the MDC script request to be communicated to the  
7 archive service web site 16 at step 44. The script request arrives at the archive service 15  
8 with a set of customer machine parameters which principally provide a return path for the  
9 MDC script from the archive service 15 to the customer 5. The customer machine  
10 parameter set preferably includes "user agent" information, which is the version of the  
11 customer browser 28.

12           At step 46, the archive service 15 generates a unique transaction ID string and  
13 associates it with the customer machine parameter set in the MDAS archive 17. At step  
14 48, the archive service returns the MDC script, with the transaction ID embedded within  
15 it, to the customer browser 28. At step 50, the customer browser 28 processes the MDC  
16 script which, at a minimum, writes the transaction ID string into the merchant's transaction  
17 form. Assuming that the customer 5 completes the transaction and submits the transaction  
18 form to the merchant 2 at step 52, the transaction ID string is stored with the transaction  
19 data record 6 in the merchant transaction database 7. The transaction ID, thus, indirectly  
20 associates the machine data parameter set 18 stored in the MDAS archive 17 at step 54  
21 with the customer identity information stored with the transaction data record 6 in the

1 merchant's transaction database 7. Thereafter, qualified parties may access the MDAS  
2 archive 17 for information related to a transaction ID.

3 The MDAS archive 17 need not contain any information which specifically  
4 identifies a particular customer, only the machine parameter profiles 18 with associated  
5 transaction ID strings. The MDAS archive records 18 can be analyzed in conjunction with  
6 the merchant transaction records for patterns of fraud or for other purposes. The great  
7 majority of MDAS archive records can be purged from the archive 17 after a selected  
8 period of time. Any records which are associated with any transaction irregularities or  
9 suspicions of actual fraud may be retained longer.

10 Fig. 5 illustrates the principal steps of a preferred embodiment 60 of the machine  
11 data collection and archiving process 1 of the present invention. The process 60 begins  
12 with the addition at 62 of a machine data collection (MDC) script to the transaction (TA)  
13 form page code of a merchant web site 3. The transaction form page code is processed at  
14 64 by a customer browser 28 when the merchant web page is accessed to thereby request  
15 the MDC script at 66 from the Machine data archive service (MDAS) web site 16. When  
16 the browser 28 accesses the MDAS web site 16, requesting the MDC script, the MDAS  
17 web site checks for the presence of an MDAS cookie at step 68. If no MDAS cookie is  
18 detected, an MDAS cookie is generated at 70 and a unique transaction identification  
19 (TA/ID) string is generated at 72. The MDC script, transaction ID, and cookie, if not  
20 previously set, are returned at 74 to the customer browser 28, the transaction ID being  
21 embedded within the MDC script.

1           When the MDC script is received by the browser 28, it is executed at 76. The  
2       cookie is stored in the cookie file 30, or possibly in the memory of the customer computer  
3       20. Execution of a preferred MDC script causes several actions to be performed. The  
4       MDC script writes the transaction ID into the transaction form at step 78. The script can  
5       do this by either setting an existing variable of an appropriate name to the transaction ID  
6       string or by writing an appropriate variable into the transaction form page and setting its  
7       value to the transaction ID string. Additionally, the preferred MDC script generates a  
8       “fingerprint” of the customer computer 20 at step 80 and attempts to perform a proxy  
9       piercing operation at step 82.

10           In generating the machine fingerprint at 80, the MDC script queries the browser 28  
11       for a number of attributes and settings and concatenates the results into an attribute string  
12       at 84. The MDC script then performs a hashing algorithm on the attribute string at 80 to  
13       generate a fingerprint string which has a high degree of uniqueness. Hashing functions are  
14       irreversible encryption processes in which the result is dependent on the original content of  
15       the data on which the hashing algorithm is operated. Hashing functions are commonly  
16       used for data integrity checking. As previously stated, a common checksum is the result  
17       of a type of hashing function. The particular hashing function employed preferably  
18       maximizes the uniqueness of the resulting fingerprint.

19           At step 86, the customer computer clock 32 is queried for a current time value. At  
20       step 88, the fingerprint, the transaction ID, and the time value are communicated to the

1 MDAS web site 16 along with an HTTP header with cookie and "apparent" IP address, all  
2 of which are stored as a machine data profile 18 within the MDAS archive 17.

3 At step 90, the MDC script adds a proxy piercer request to the transaction form  
4 which, when executed by the browser 28 at step 92, sends a request for a proxy piercer  
5 applet or code to the MDAS web site 16. When the proxy piercer applet/code is executed  
6 by the browser 28 at 94, a time value from the clock 32 is again queried at 96 and any  
7 existing local area network (LAN) address is queried at 98. At step 100, the proxy piercer  
8 applet/code sends the time value, the LAN address (if any), and the transaction ID to the  
9 MDAS web site 16 by a protocol which bypasses any existing HTTP proxy 26. The  
10 protocol used is one which is at a lower level than HTTP, such as UDP (user datagram  
11 protocol) or, preferably, TCP/IP (transmission control protocol/internet protocol).

12 Bypassing the HTTP proxy 26 causes the data sent in step 100 to arrive at the  
13 MDAS web site 16 with the IP address of the primary gateway 22, which may be different  
14 from any apparent IP address previously recorded if an HTTP proxy 26 intervenes. If the  
15 proxy piercer procedure 82 is successful, the primary gateway IP address is stored at step  
16 102 within the machine data profile 18 identified by the transaction ID. It should be noted  
17 that some types of proxies, such as some types of firewalls, may block all non-HTTP  
18 protocol packets, so that the proxy piercer procedure 82 might not be successful in all  
19 cases.

1        If the customer completes the transaction with the merchant web site 3, the  
2        transaction form is submitted at step 104, which causes the transaction record 6, including  
3        the transaction ID, to be stored at step 106 in the merchant database 7 for processing.

4        Following are examples of code for an MDC script, as from steps 40 or 62.  
5        Assuming the machine data archiving service or MDAS web site 16 has the fictional URL  
6        (uniform resource locator) example-url.net and a specific merchant has a merchant  
7        identifier MMM, a line of HTML code is added at step 40 to the transaction form of  
8        merchant MMM between the <form> and </form> HTML tags which has the form:

9  
10       <script src=https://www.example-url.net/s/?MMM></script>

11  
12       When the customer browser 28 processes the transaction form at step 42, it  
13       requests a script file from the source URL: https://www.example-url.net/s/?MMM.

14       At step 44, the customer web browser 28 requests the MDC script by way of the  
15       HTTP protocol. The HTTP request includes the merchant ID MMM, the user agent  
16       (browser version), the IP address of the customer's HTTP proxy, and any HTTP cookies  
17       previously sent to the customer by www.example-url.net. Upon receiving this  
18       information, the archive service 16 records this information in a machine data record  
19       which also includes the transaction ID.

20       Upon receiving the file request, the archive service 16 generates a unique  
21       transaction ID (represented below as ZZZ) at step 46 to be associated with the transaction

1 and the machine parameter set. An exemplary transaction ID is a string of 24 letters and  
2 digits. The first eight digits form a time stamp which is a hexadecimal representation of  
3 the seconds elapsed since midnight January 1, 1970 UTC (coordinated universal time).

4 In the preferred embodiment of the process 1, the MDC script is written in an  
5 ECMAScript compliant language, such as JavaScript, JScript, or VBScript. A JavaScript  
6 version of the MDC script is as follows (linebreaks and indentations added for clarity):

```
7  
8     document.write("<input name=transactionid type=hidden value=ZZZ>";  
9  
10    d=new Date();  
11  
12    t=3600*d.getHours()+60*d.getMinutes()+d.getSeconds();  
13  
14    document.write("<img height=1 width=1    src=https://www.example-  
15    url.net/t/?i=ZZZ&t="+t+">");  
16  
17    document.write("<applet height=1 width=1  
18    codebase=https://www.example-url.net/  
19    code=a/?ZZZ>  
20    <param name=i value=ZZZ></applet>");  
21
```

1           The exemplary MDC script includes the unique transaction ID value in several  
2 places. When the script executes on the customer computer 20, it writes HTML code into  
3 the merchant's order form. Specifically:

4           1)     The script adds a hidden variable called "transactionid" to the merchant's  
5 transaction form and assigns it the value of the transaction ID (ZZZ). When the  
6 transaction form is submitted, the merchant receives the transaction ID and can associate  
7 it with the transaction data record.

8           2)     The script computes the seconds elapsed since midnight on the clock 32  
9 and writes a request for a 1 pixel by 1 pixel image. Included in the request is the  
10 transaction ID and the time value. When the request executes, this data is sent back to the  
11 archive service 16 and recorded with the transaction ID in the MDAS archive 17.

12          3)     The script adds a request for a program located at the archive service web  
13 site 16 which, in this example, is a Java applet. The applet downloads to the customer  
14 computer 20 from the archive service 16 and executes, appearing as a 1 pixel by 1 pixel  
15 image on the transaction form. The transaction ID is passed to the program as a  
16 parameter specified in the script. The program performs three tasks:

17          a)     it calculates TTT, the seconds elapsed since midnight on the system clock  
18 32;

19          b)     it calculates AAA, the address of the customer 20 on its own local area  
20 network 24; and



1           c)     it sends this data back to the archive service 16 via TCP/IP, by requesting  
2           the following URL:

3                     <http://www.example-url.net/d/?i=ZZZ&t=TTT&a=AAA>

4           The archive service 16 receives the message which includes the parameters TTT,  
5     AAA, and ZZZ. The message also includes the IP address of the sender. This address is  
6     the customer's actual IP address, which in some cases is different from the HTTP proxy IP  
7     address. The archive service 16 records this information in the MDAS archive 17 and  
8     associates it with the transaction ID ZZZ.

9           The machine data collection and archiving process 1 of the present invention has  
10    been described with a particular application in fraud detection. However, it is foreseen  
11    that the techniques of the present invention have a wider application, as for marketing or  
12    computer support purposes, or other functions. While the process 1 has been described  
13    with reference to the internet 4 or world wide web, it is also conceivable that the process 1  
14    could be employed on computer networks of less than global expanse, such as a large  
15    intranet, a national or regional network, or the like.

16          Therefore, it is to be understood that while certain forms of the present invention  
17    have been illustrated and described herein, the present invention is not intended to be  
18    limited to the specific forms, arrangement of parts, sequence of steps, or particular  
19    applications described and shown.

20

## **CLAIMS**

What is claimed and desired to secure by Letters Patent is:

1. A process for collecting machine identifying information associated with a digital online access device used for substantially anonymously accessing a host computer system over a digital network, said host computer system generating an interaction record of an access therewith by said access device, and said process comprising the steps of:
  - (a) capturing a machine identifying profile parameter upon said access device accessing said host computer system;
  - (b) generating a unique interaction identification string upon said access device accessing said host computer system;
  - (c) associating said interaction identification string with said profile parameter; and
  - (d) associating said interaction identification string with said interaction record generated upon said access device accessing said host computer system.
2. A process as set forth in Claim 1 wherein said capturing step includes the step of:
  - (a) capturing a digital address of said access device on said digital network.
3. A process as set forth in Claim 1 wherein said capturing step includes the step of:
  - (a) capturing a configuration setting of said access device.

4. A process as set forth in Claim 1 and including the steps of:
  - (a) communicating a self-identification routine to said access device upon said access device accessing said host computer system;
  - (b) said access device executing said self-identification routine;
  - (c) said self-identification routine querying a configuration setting of said access device to derive said profile parameter; and
  - (d) said self-identification routine communicating said profile parameter to a remote location for association with said interaction identification string.
5. A process as set forth in Claim 1 and including the steps of:
  - (a) said host system operating a host web site including an interaction page generated by interaction page code processed by said access device upon accessing said host web site; and
  - (b) coding, within said interaction page code, a self-identification routine which causes said access device to communicate said profile parameter when said access device processes said interaction page code.
6. A process as set forth in Claim 3 and including the step of:
  - (a) coding said self-identification routine in such a manner that said profile parameter and said interaction identification string are communicated to a

third party web site at which said profile parameter and said interaction identification string are stored.

7. A process for identifying a customer computer involved in an online transaction between a customer using a customer browser operating on said customer computer and a merchant operating a merchant web site, said method comprising the steps of:
  - (a) capturing a customer computer profile parameter upon said customer computer accessing said merchant web site;
  - (b) generating a transaction identification string and associating said string with said parameter;
  - (c) storing said parameter and said string in a machine data archive;
  - (d) upon said customer completing a transaction through said merchant web site, storing said transaction identification string with a transaction record formed during said transaction to thereby associate said parameter with said transaction record through said string.
8. A process as set forth in Claim 7 wherein said capturing step includes the step of:
  - (a) capturing an IP address of said customer computer.

9. A process as set forth in Claim 7 wherein said capturing step includes the step of:
  - (a) capturing a configuration setting of said customer computer.
10. A process as set forth in Claim 7 and including the step of:
  - (a) communicating said profile parameter and said transaction identification string to a third party web site for storage.
11. A process as set forth in Claim 7 and including the step of:
  - (a) causing said customer computer to communicate said profile parameter and said transaction identification string to a third party web site for storage.
12. A process as set forth in Claim 7 and including the steps of:
  - (a) communicating a self-identification routine to said customer computer upon said customer computer accessing said merchant web site;
  - (b) said customer computer executing said self-identification routine;
  - (c) said self-identification routine querying a configuration setting of said customer computer to derive said profile parameter; and
  - (d) said self-identification routine communicating said profile parameter to a remote location for association with said interaction identification string.

13. A process as set forth in Claim 12 and including the step of:
  - (a) coding said self-identification routine in such a manner that said profile parameter and said interaction identification string are communicated to a third party web site at which said profile parameter and said interaction identification string are stored.
14. A process as set forth in Claim 12 wherein said querying step includes the steps of:
  - (a) querying said customer browser for a plurality of configuration settings;
  - (b) forming an attribute string from said plurality of configuration settings; and
  - (c) processing said attribute string to form said profile parameter of said customer computer.
15. A process as set forth in Claim 12 wherein said customer computer potentially accesses said merchant web site by way of a proxy, and said communicating step includes the steps of:
  - (a) communicating said profile parameter and said transaction identification string to said remote web site using a protocol which bypasses said proxy.
16. A process for identifying a customer computer involved in an online transaction through a merchant web site between a customer using a customer browser

operating on said customer computer and a merchant who operates said web site, said method comprising the steps of:

- (a) coding a script request within a transaction form of said merchant web site;
- (b) processing said script request by said customer browser upon accessing said merchant web site to thereby communicate to an archiver web site of a machine data archiving service an electronic request for a machine data collection script;
- (c) said archiver web site returning said script to said customer browser along with a unique transaction identification string;
- (d) said customer browser processing said script to thereby cause said script to query said customer computer for a profile parameter of said customer computer;
- (e) said script causing said customer browser to communicate said profile parameter and said transaction identification string to said archiver web site;
- (f) said archiver web site storing said profile parameter and said transaction identification string in a machine data profile;
- (g) said script causing said customer browser to write said transaction identification string into said transaction form; and
- (h) upon said customer adding customer identification information to said transaction form and electronically submitting said transaction form to said

merchant web site to thereby comprise a transaction record, said transaction identification string associating said transaction record with said machine data profile.

17. A process as set forth in Claim 16 and including the steps of:
  - (a) said script causing said computer browser to communicate said profile parameter and said transaction identification string along with a conventional hypertext transfer protocol (HTTP) header; and
  - (b) said archiver service additionally storing said HTTP header in association with said machine data profile.
18. A process as set forth in Claim 16 and including the step of:
  - (a) said script querying said customer browser for a configuration setting thereof.
19. A process as set forth in Claim 16 and including the steps of:
  - (a) said script querying said customer browser for a plurality of configuration settings;
  - (b) said script forming an attribute string from said plurality of configuration settings; and



- (c) said script processing said attribute string to form said profile parameter of said customer computer.
- 20. A process as set forth in Claim 19 wherein said script processing step includes the step of:
  - (a) said script performing a hashing function on said attribute string to form said profile parameter.
- 21. A process as set forth in Claim 16 wherein said customer computer potentially accesses said merchant web site by way of a proxy, and including the step of:
  - (a) said script communicating said profile parameter and said transaction identification string to said archiver service web site using a protocol which bypasses said proxy.
- 22. A process as set forth in Claim 16 and including the step of:
  - (a) said script communicating said profile parameter to said archiver service web site using a protocol other than HTTP.
- 23. A process as set forth in Claim 16 wherein said customer computer includes a digital clock, and including the steps of:

- (a) said script causing said customer browser to query said clock for a time value; and
- (b) said script causing said customer browser to send said time value to said archiver service web site along with said profile parameter.

24. A process for identifying a customer computer involved in an online transaction through a merchant web site between a customer using a customer browser operating on said customer computer and a merchant who operates said web site, said method comprising the steps of:

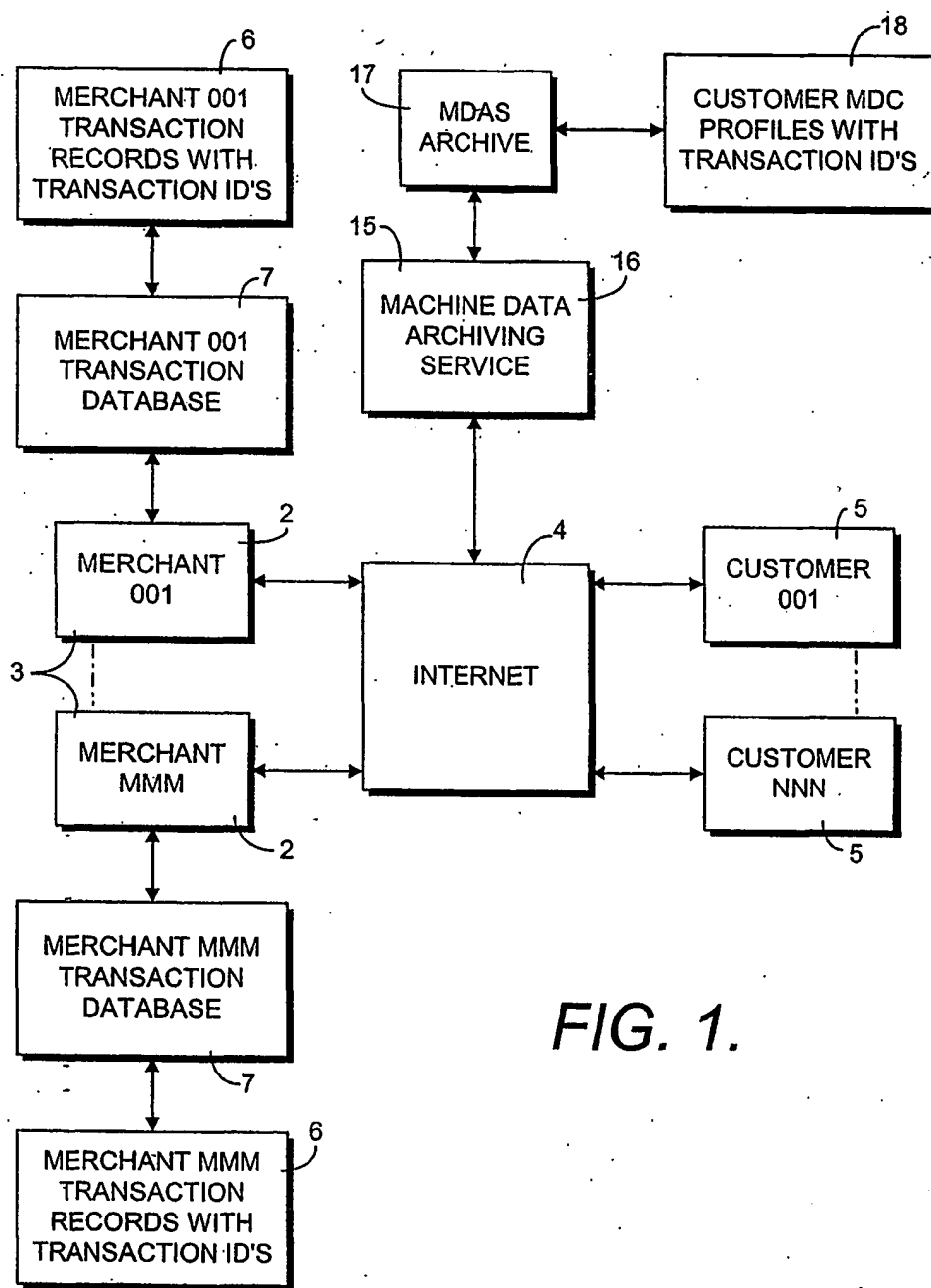
- (a) coding a script request within a transaction form of said merchant web site;
- (b) processing said script request by said customer browser upon accessing said merchant web site to thereby communicate to an archiver web site of a machine data archiving service an electronic request for a machine data collection script;
- (c) said archiver web site returning said script to said customer browser along with a unique transaction identification string;
- (d) said customer browser processing said script to thereby cause said script to:
  - (1) query said customer browser for a plurality of configuration settings;
  - (2) form an attribute string from said plurality of configuration settings;

- (3) perform a hashing function on said attribute string to form said profile parameter; and
  - (4) query an internal digital clock of said customer computer for a current time value;
  - (e) said script causing said customer browser to communicate said profile parameter, said time value, and said transaction identification string to said archiver web site along with a conventional HTTP header;
  - (f) said archiver web site storing said profile parameter, said time value, and said transaction identification string in a machine data profile;
  - (g) said script causing said customer browser to write said transaction identification string into said transaction form; and
  - (h) upon said customer adding customer identification information to said transaction form and electronically submitting said transaction form to said merchant web site to thereby comprise a transaction record, said transaction identification string associating said transaction record with said machine data profile.
25. A process as set forth in Claim 24 wherein said customer computer potentially accesses said merchant web site by way of a proxy, and including the steps of:
- (a) said script querying said customer computer for a second profile parameter;
  - and

- (b) said script communicating said second profile parameter and said transaction identification string to said archiver service web site using a protocol which bypasses said proxy.

26. A process as set forth in Claim 25 and including the step of:

- (a) said script communicating said second profile parameter to said archiver service web site using a protocol other than HTTP.



**FIG. 1.**

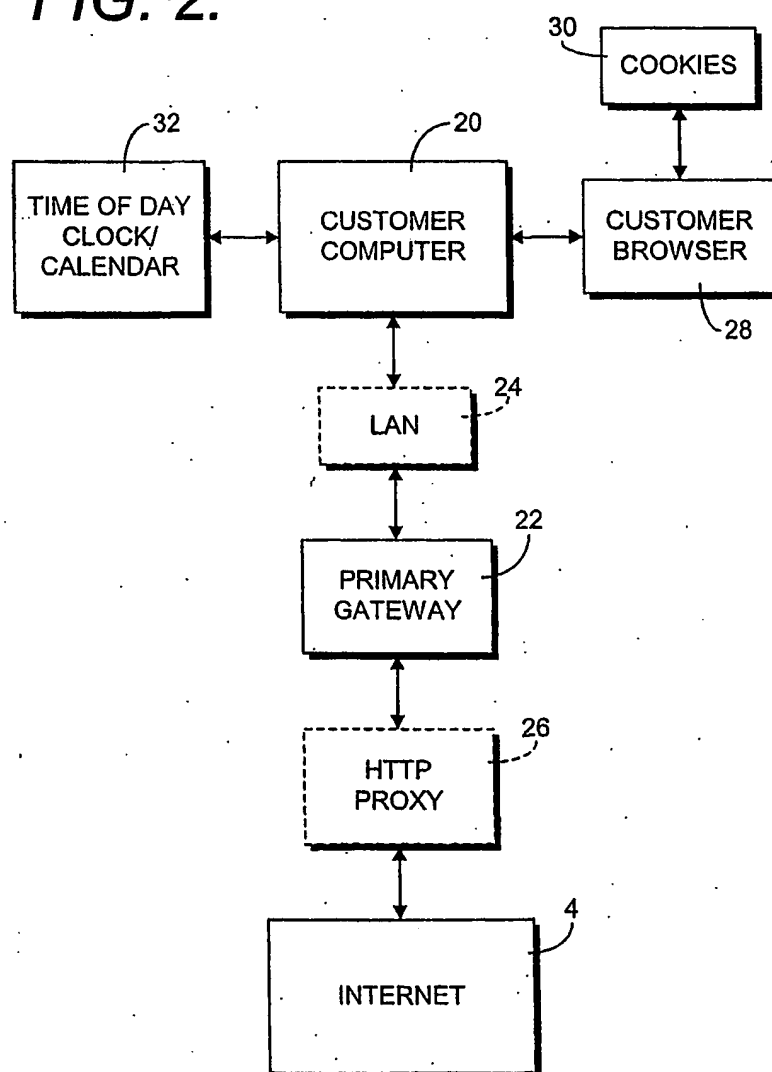
**FIG. 2.**

FIG. 3.

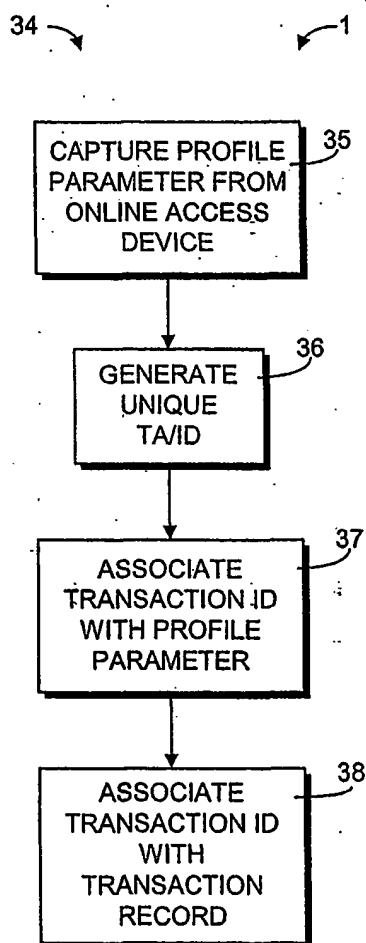
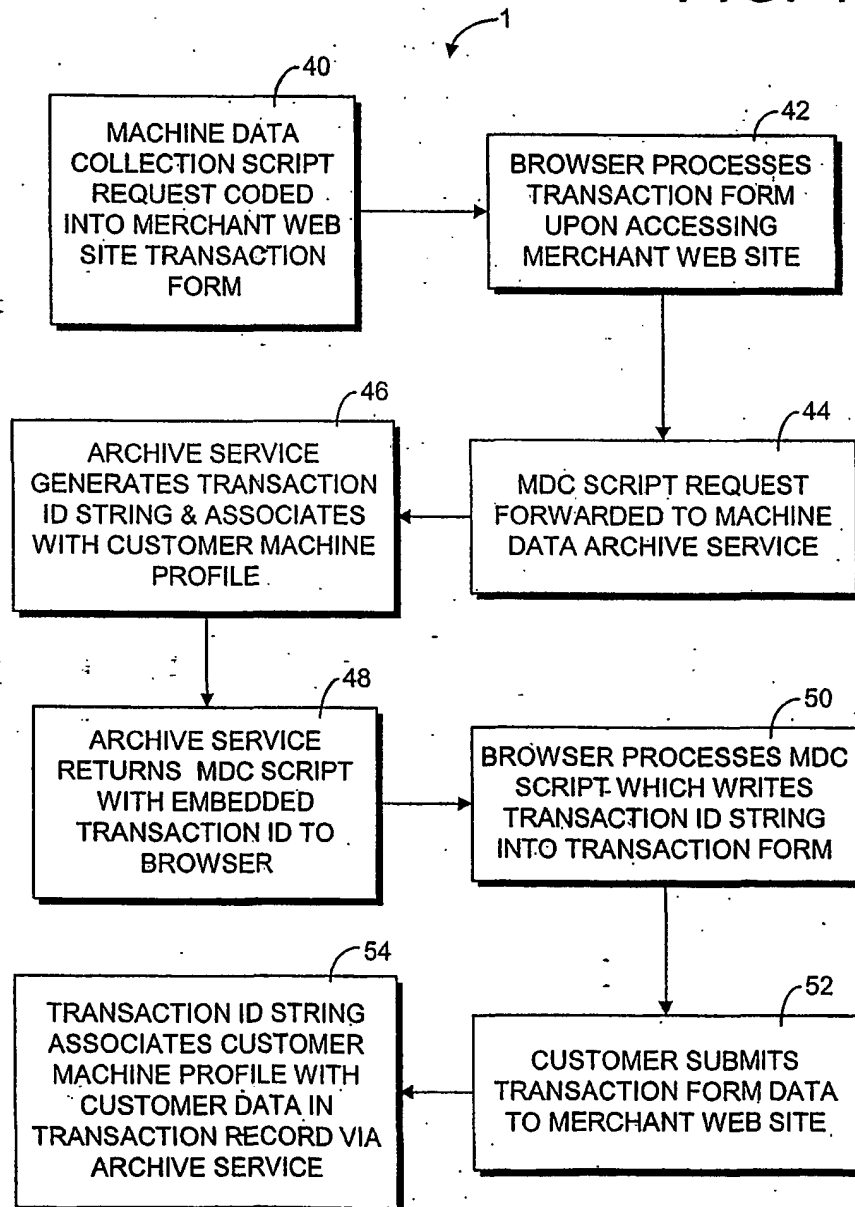


FIG. 4.





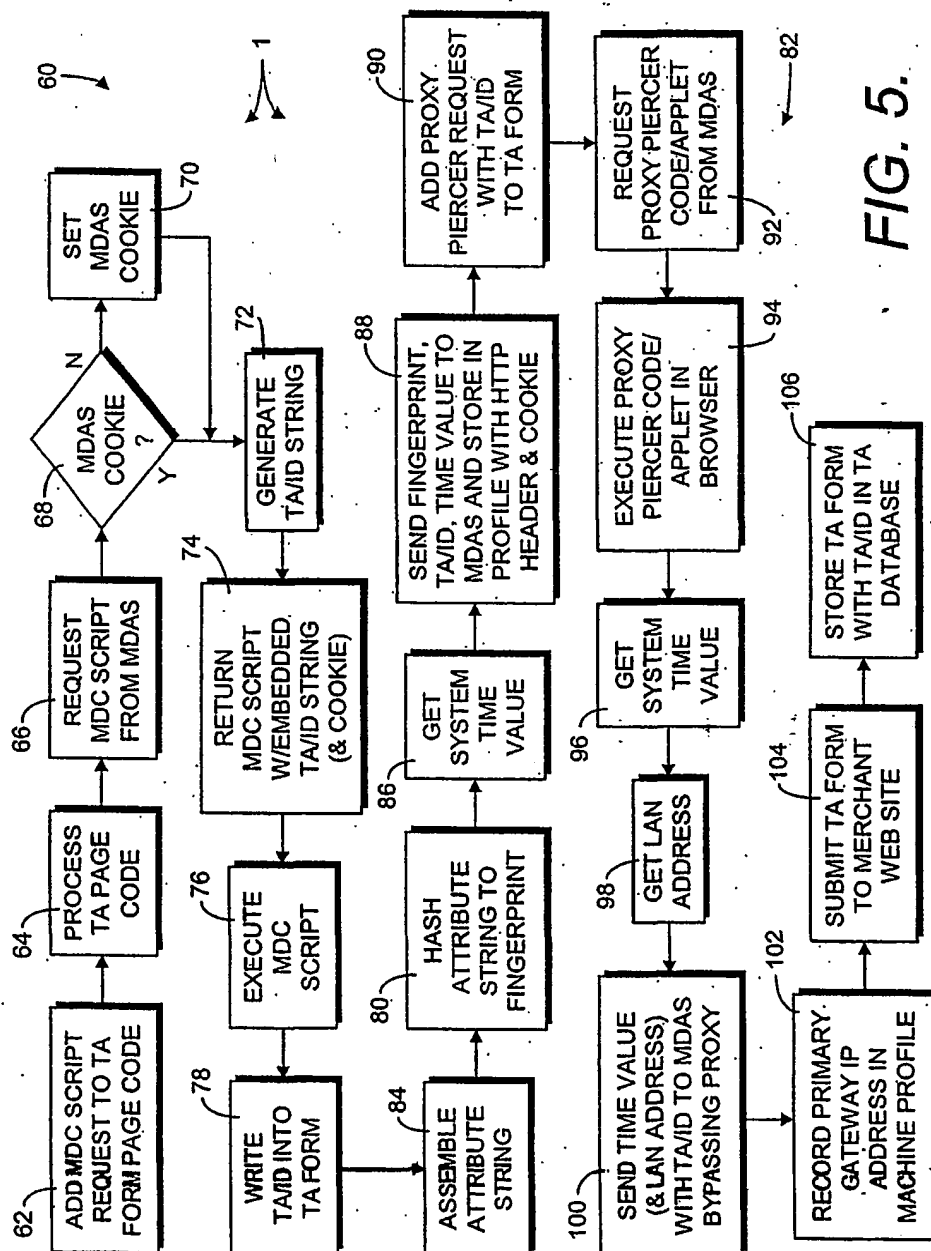


FIG. 5.

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US01/18076

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
IPC(7) : G06F 17/60 US CL : 705/10 According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols) U.S. : 705/10		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EAST search terms: digital, anonymous, server, network, web, record, profile, interaction, transaction, identification, string, proxy, third party		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,848,412 A (ROWLAND et al).08 December 1998, all.	1-26
A	US 5,991,758 A (ELLARD) 23 November 1999, all.	1-26
A.P	US 6,117,011 A (LVOV) 12 September 2000, all.	1-26
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
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"P" document published prior to the international filing date but later than the priority date claimed		
Date of the actual completion of the international search 06 AUGUST 2001	Date of mailing of the international search report 04 SEP 2001	
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer Tariq Hafiz <i>Pasquillo</i> Telephone No. (703) 305-3900	